

Borehole

30-08-02**Log Event A****Borehole Information**

Farm : <u>C</u>	Tank : <u>C-108</u>	Site Number : <u>299-E27-94</u>
N-Coord : <u>42,965</u>	W-Coord : <u>48,363</u>	TOC Elevation : <u>647.00</u>
Water Level, ft :	Date Drilled : <u>9/30/1974</u>	

Casing Record

Type : <u>Steel-welded</u>	Thickness, in. : <u>0.280</u>	ID, in. : <u>6</u>
Top Depth, ft. : <u>0</u>	Bottom Depth, ft. : <u>100</u>	

Borehole Notes:

This borehole was drilled in September 1974 and completed to a depth of 100 ft with 6-in. casing. The casing thickness is presumed to be 0.280 in., on the basis of the published thickness for schedule-40, 6-in. steel tubing. No information was available that indicated the borehole casing was perforated or grouted; therefore, it is assumed that the borehole was not perforated or grouted. The top of the casing, which is the zero reference for the SGLS, is flush with the ground surface.

Equipment Information

Logging System : <u>1B</u>	Detector Type : <u>HPGe</u>	Detector Efficiency: <u>35.0 %</u>
Calibration Date : <u>02/1997</u>	Calibration Reference : <u>GJO-HAN-13</u>	Logging Procedure : <u>P-GJPO-1783</u>

Log Run Information

Log Run Number : <u>1</u>	Log Run Date : <u>03/18/1997</u>	Logging Engineer: <u>Gary Lekvold</u>
Start Depth, ft.: <u>0.0</u>	Counting Time, sec.: <u>100</u>	L/R : <u>L</u> Shield : <u>N</u>
Finish Depth, ft. : <u>21.0</u>	MSA Interval, ft. : <u>0.5</u>	Log Speed, ft/min.: <u>n/a</u>

Log Run Number : <u>2</u>	Log Run Date : <u>03/19/1997</u>	Logging Engineer: <u>Gary Lekvold</u>
Start Depth, ft.: <u>20.0</u>	Counting Time, sec.: <u>100</u>	L/R : <u>R</u> Shield : <u>N</u>
Finish Depth, ft. : <u>24.5</u>	MSA Interval, ft. : <u>0.5</u>	Log Speed, ft/min.: <u>n/a</u>

Log Run Number : <u>3</u>	Log Run Date : <u>03/19/1997</u>	Logging Engineer: <u>Gary Lekvold</u>
Start Depth, ft.: <u>22.5</u>	Counting Time, sec.: <u>100</u>	L/R : <u>L</u> Shield : <u>N</u>
Finish Depth, ft. : <u>93.5</u>	MSA Interval, ft. : <u>0.5</u>	Log Speed, ft/min.: <u>n/a</u>

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30-08-02**Log Event A**

Log Run Number :	<u>4</u>	Log Run Date :	<u>03/20/1997</u>	Logging Engineer:	<u>Alan Pearson</u>
Start Depth, ft.:	<u>99.0</u>	Counting Time, sec.:	<u>100</u>	L/R : <u>L</u>	Shield : <u>N</u>
Finish Depth, ft. :	<u>92.5</u>	MSA Interval, ft. :	<u>0.5</u>	Log Speed, ft/min.:	<u>n/a</u>

Analysis Information

Analyst : E. LarsenData Processing Reference : MAC-VZCP 1.7.9Analysis Date : 09/05/1997

Analysis Notes :

This borehole was logged by the SGLS in four log runs. Excessive dead time (greater than 50 percent) was encountered during log run one at a depth of 21 ft. As a result, log run two was logged in real time from 20 to 24.5 ft. Log runs three and four were logged in live time from 22.5 to 99 ft, after the dead time dropped below 50 percent.

The pre- and post-survey field verification spectra met the acceptance criteria established for the peak shape and detector efficiency, confirming that the SGLS was operating within specifications. The energy calibration and peak-shape calibration from these spectra were used to establish the channel-to-energy parameters used in processing the spectra acquired during the logging operation.

Casing correction factors for a 0.280-in.-thick steel casing were applied during analysis.

The man-made radionuclides Cs-137, Co-60, and Eu-154 were detected around this borehole. Cs-137 contamination was detected continuously from the ground surface to 24.5 ft. Cs-137 contamination was also detected from 27 to 27.5 ft, 47 to 49 ft, and at the bottom of the logged interval (99 ft). The Co-60 contamination was detected continuously from 46.5 to 79.5 ft. The Eu-154 contamination was detected at 2.5 ft and nearly continuously from 19.5 to 22.5 ft.

An analysis of the shape factors associated with applicable segments of the spectra was performed. The shape factors provide insights into the distribution of the Cs-137 and Co-60 contamination and into the nature of zones of elevated total count gamma-ray activity not attributable to gamma-emitting radionuclides.

The K-40 concentration values increase at 37.5 ft and generally remain elevated to a depth of 72.5 ft. The K-40 concentrations become increasingly variable between 55 and 74.5 ft. The K-40 concentrations increase again at 74.5 ft and remain elevated to the bottom of the logged interval. The Th-232 concentrations gradually increase near 85 ft to the bottom of the logged interval.

Most of the K-40 and Th-232 concentration data are absent between 20 and 22 ft. The U-238 concentration data are absent between 18 and 23.5 ft and mostly absent between 57.5 and 65 ft.

Additional information and interpretations of log data are included in the main body of the Tank Summary Data Reports for tanks C-108 and C-109.



Spectral Gamma-Ray Borehole Log Data Report

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Log Plot Notes:

Separate log plots show the man-made and the naturally occurring radionuclides. The natural radionuclides can be used for lithology interpretations. The headings of the plots identify the specific gamma rays used to calculate the concentrations.

Uncertainty bars on the plots show the statistical uncertainties for the measurements as 95-percent confidence intervals. Open circles on the plots give the MDL. The MDL of a radionuclide represents the lowest concentration at which positive identification of a gamma-ray peak is statistically defensible.

A combination plot includes the man-made and natural radionuclides, the total gamma derived from the spectral data, and the Tank Farms gross gamma log. The gross gamma plot displays the latest available digital data. No attempt has been made to adjust the depths of the gross gamma logs to coincide with the SGLS data.

A plot of representative historical gross gamma-ray logs from 1980 to 1989 is included. The headings of the plots identify the date on which the data in the plots were gathered.

Plots of the spectrum shape factors are also included. The plots are used as an interpretive tool to help determine the radial distribution of man-made contaminants around the borehole.